

RESISTIVE TERMINATIONS METALLIC RETURN

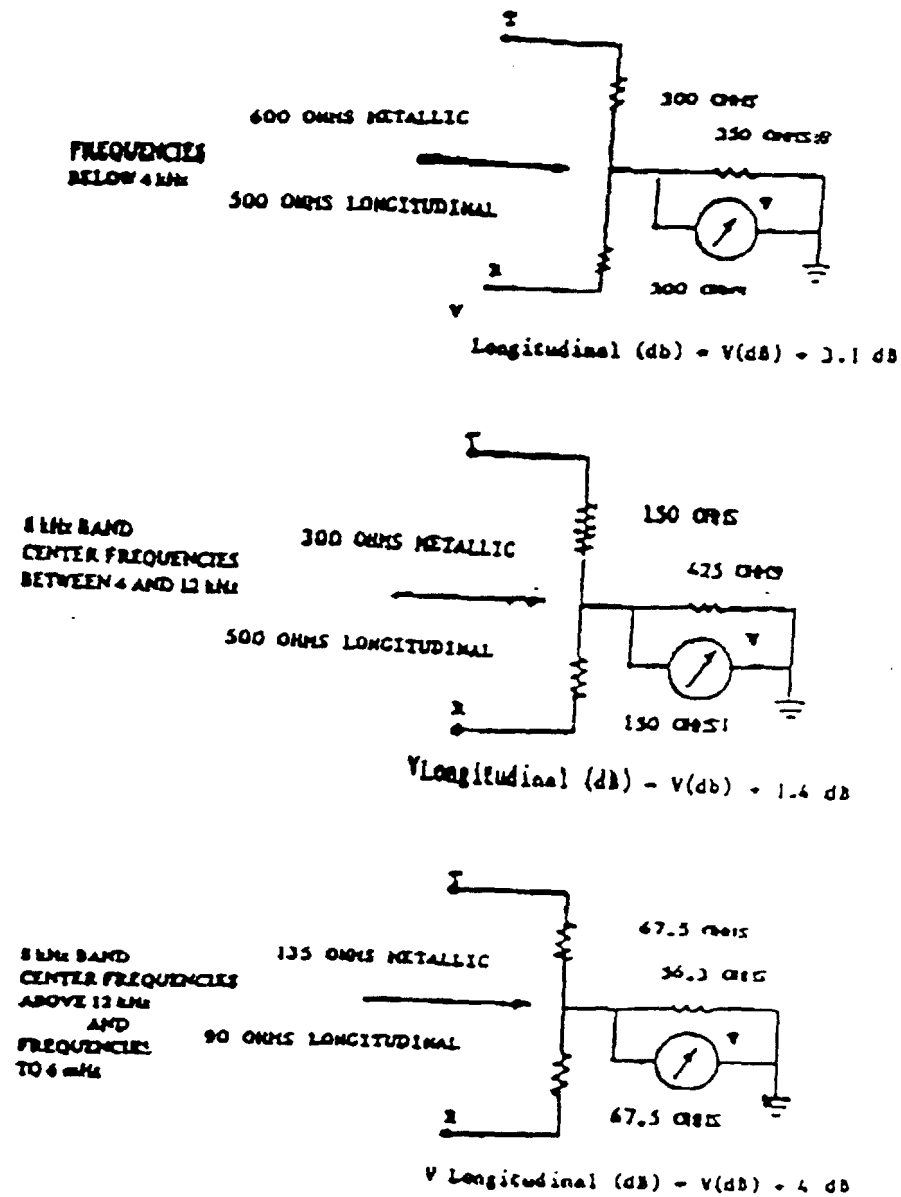


Figure 68.308(a)

§ 68.310 Transverse balance limitations.

(Reworded and Changed)

(a) *Technical Description and Application.* The Transverse Balance_{m-1} coefficient is expressed as

$$BALANCE_{m-1} = 20 \log_{10} \frac{e_M}{e_L}$$

Where e_L is the longitudinal voltage produced across a longitudinal termination Z_L and e_M is the metallic voltage across the tip-ring or tip 1 and ring 1 interface of the input port when a voltage (at any frequency between f_1 and $< f_2$, see Table 68.310-1) is applied from a balanced source with a metallic impedance Z_0 (see Table 68.310-1). The source voltage should be set such that $e_M = E$ volts (see Table 68.310-1) when a termination of Z_0 is substituted for the terminal equipment.

The minimum transverse balance coefficient specified in this section (as appropriate) shall be equalled or exceeded for all 2-wire network ports, OPS line ports and the transmit pair (tip and ring) and receive pair (tip 1 and ring 1) of all 4-wire network ports at all values of dc loop current that the port under test is capable of drawing when attached to the appropriate loop simulator circuit (See § 68.3). An illustrative test circuit that satisfies the above conditions is shown in Figure 68.310-1(a) for analog and 68.310-1(b) for digital and substrate; other means may be used to determine the transverse balance coefficient specified herein, provided that adequate documentation of the appropriateness, precision, and accuracy of the alternative means is provided by the applicant.

The minimum transverse balance requirements specified below shall be equalled or exceeded under all reasonable conditions of the application of earth ground to the equipment or protective circuitry under test.

Table 68.310-1

	Analog Voiceband	Subrate Digital	1.544 Mbps Digital
Longitudinal Termination - Z_1	500 Ω	See Table 310-2	90 Ω
Metallic Source Impedance - Z_0	600 Ω	135 Ω	100 Ω
Lower Frequency - f_1	200 Hz	200 Hz	10 kHz
Upper Frequency - f_2	4 kHz	*	1.544 MHz
Metallic Voltage for Test - E	0.775 V	0.367 V	0.316 V

* The upper frequency equals the digital line rate for the subrate service under test (See Table 68.310-2).

(b) *Analog Voiceband Equipment.* All registered analog voiceband equipment shall be tested in the off-hook state. The minimum transverse balance requirement in the off-hook state shall be 40 dB, throughout the range of frequencies specified in Table 68.310-1. For some categories of equipment, additional requirements also apply to the on-hook state. When both off-hook and on-hook requirements apply, they are:

State	Frequency (f)	Balance
Off-hook	200 Hz \leq f \leq 4000 Hz	\geq 4 dB
On-hook	200 Hz \leq f \leq 1000 Hz	\geq 6 dB
On-hook	1000 Hz \leq f \leq 4000 Hz	\geq 4 dB

(i) For analog one-port 2-wire terminal equipment with loop-start, ringdown, or inband signaling or for voiceband metallic channel applications, both off-hook and on-hook requirements apply.

(ii) For analog one port equipment with ground-start and reverse-battery signaling only off-hook requirements apply.

balance coefficient is being measured shall have a metallic impedance of 600 Ohms and a longitudinal impedance of 500 Ohms. Figure 68.310-3 shows this termination.

(vii) For analog registered terminal equipment and protective circuitry for 4-wire network ports, both the off-hook and on-hook requirements apply.

The pair not under test shall be terminated in a metallic impedance of 600 Ohms. Other conditions are as follows:

(A) For analog registered protective circuitry with loop-start, ground-start, reverse battery, ringdown, or inband signaling; or for voiceband metallic channel applications. Criteria shall be met with either terminal of the interface to other equipment connected to earth ground. The interface to other equipment shall be terminated in an impedance that will result in 600 Ohms at each of the transmit and receive pairs of the 4-wire telephone connection in the off-hook state of the registered protective circuit, and the interface should not be terminated in the on-hook state. Figure 68.310-4 shows the interface of the protective circuitry being tested and the required arrangement at the interface to other equipment.

(B) For analog multiport equipment with loop start, ground start, and reverse battery, ringdown, or inband signaling; or for voiceband metallic channel applications. Criteria shall be satisfied for all network ports when all the ports not under test are terminated as defined below, and when interface connections other than the network ports are terminated in circuits appropriate to the interface. The criteria shall also be satisfied for all values of dc loop current that when the port is connected to the appropriate 4-wire loop simulator circuit. The terminations for both pairs of all network ports not under test shall have a metallic impedance of 600 Ohms and a longitudinal impedance of 500 Ohms. Figure 68.310-3 shows this termination.

(viii) For analog PBX equipment (or similar systems) with class B or class C off-premises interfaces, only off-hook requirements apply. Criteria shall be satisfied for all off-premises station interface ports when these ports are terminated in their appropriate networks for their off-hook state, and when all other interface connections are terminated in circuits appropriate to that interface. The minimum transverse balance coefficients shall also be satisfied for all values of dc loop current that the registered PBX is capable of providing through off-premises station ports when these ports are attached to the off-premises line simulator circuit specified in these rules.

(ix) For Type Z equipment with loop-start signaling, both off-hook and on-hook requirements apply. Equipment which has on-hook impedance characteristics which do not conform to the requirements of § 68.312 (e.g., Type Z), shall comply with minimum transverse balance requirements of 40 dB in the voiceband. See § 68.312(h) for conditions

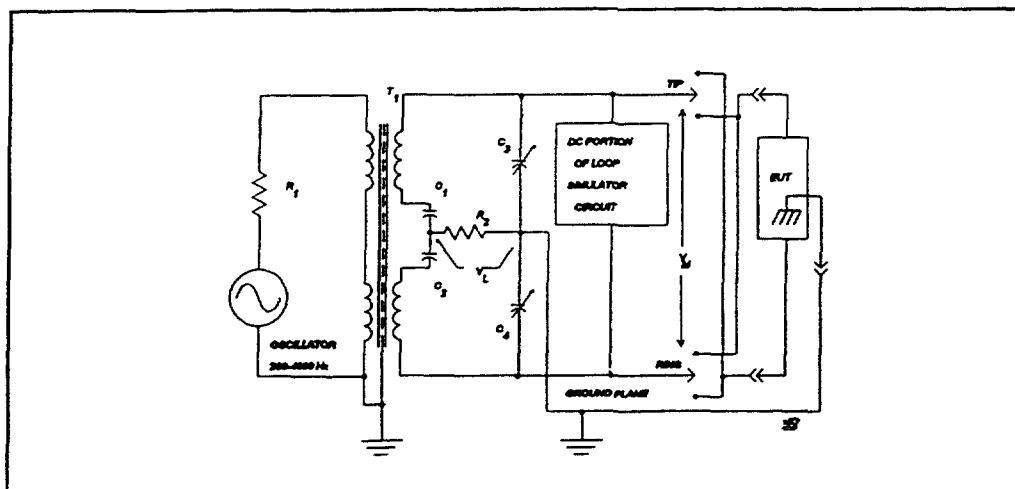
upon registration of "Type Z" equipment.

(c) *Digital Equipment.* The minimum transverse balance requirements for registered terminal equipment connected to digital services shall be equalled or exceeded for the range of frequencies applicable for the equipment under test and under all reasonable conditions of the application of earth ground to the equipment. All such terminal equipment shall have a transverse balance in the acceptable region of Figure 68.310-5 for the range of frequencies shown in Table 68.310-2 for the specified digital service in question. The metallic impedance used for the transverse balance measurements for all subrate services shall be 135 Ohms and for 1.544 Mbps shall be 100 Ohms. The longitudinal termination for subrate services shall be as defined in Table 68.310-2 and 1.544 Mbps shall be 90 Ohms.

Table 68.310-2
Frequency Ranges of Transverse Balance
Requirements for Digital Services

Digital Service	Frequency Range	Longitudinal Termination	Metallic Termination
2.4	200 to 2.4 kHz	500	135
3.2	200 to 3.2 kHz	500	135
4.8	200 to 4.8 kHz	500	135
6.4	200 to 6.4 kHz	500	135
9.6	200 to 9.6 kHz	500	135
12.8*	200 to 12.8 kHz	500/90	135
19.2*	200 to 19.2 kHz	500/90	135
25.6*	200 to 26.6 kHz	500/90	135
56*	200 to 56 kHz	500/90	135
72*	200 to 72 kHz	500/90	135
1.544	10 kHz to 1.544 MHz	90	100

* Note: For 200 to 12 kHz the longitudinal termination shall be 500 Ohms and above 12 kHz the longitudinal termination shall be 90 Ohms.



T_1 600 Ω :600 Ω split audio transformer

C_1, C_2 8 μF , 400 V dc, matched to within 0.1 %

C_3, C_4 100 to 500 pF adjustable trimmer capacitors

Osc. Audio oscillator with source resistance R_1 less than or equal to 600 Ohms

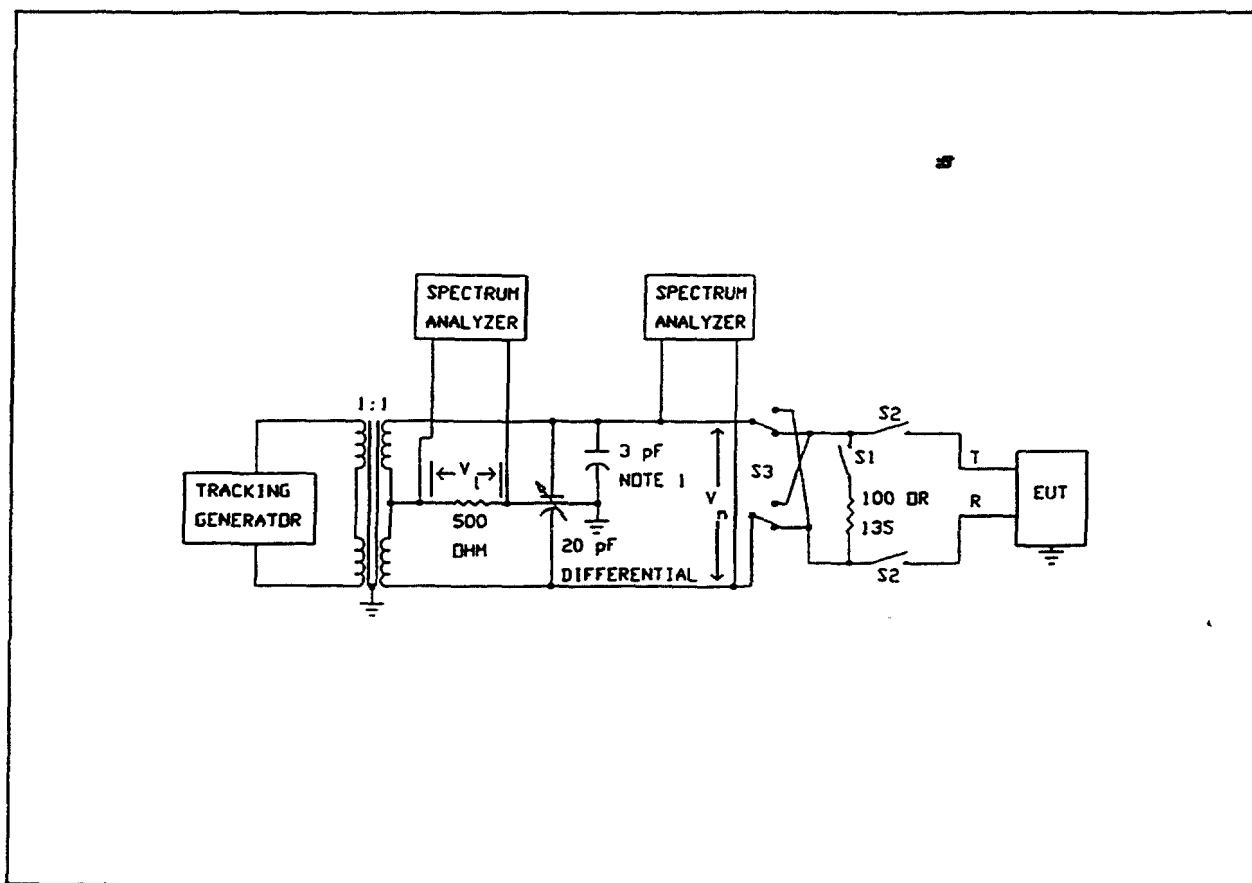
R_1 Selected such that $Z_{\text{osc}} + R_1 = 600 \Omega$

R_2 500 Ω

NOTES:

1. V_M should not be measured at the same time as V_L
2. Use trimmer capacitors C_3 and C_4 to balance the test circuit to 20 dB greater balance than the equipment standard for all frequencies specified, with a 600 Ohm resistor substituted for the equipment under test.
3. Exposed conductive surfaces on the exterior of the equipment under test should be connected to the ground plane for this test.
4. When the Terminal Equipment makes provision for an external connection to ground (G), the Terminal Equipment shall be connected to ground. When the Terminal Equipment makes no provision for an external ground, the Terminal Equipment shall be placed on a ground plane which is connected to ground and has overall dimensions at least 50 % greater than the corresponding dimensions of the Terminal Equipment. The Terminal Equipment shall be centrally located on the ground plane without any additional connection to ground.

Figure 68.310-1(a)
Illustrative Test Circuit for Transverse Balance (Analog)



T_1 : 100 Ω :100 Ω C.T. wide band transformer

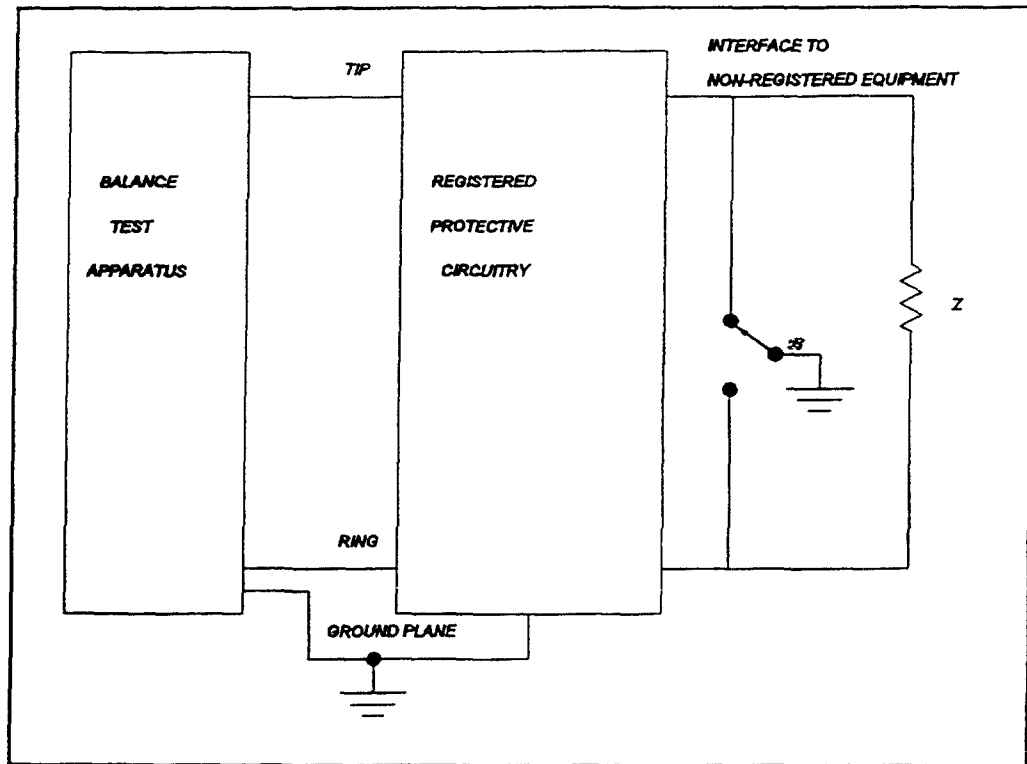
12.4 to 24.5 pF differential trimmer

$R_L Z_1$ from Table 68.310-1

$R_{CAL} Z_0$ from Table 68.310-1

R_1 -Selected so that $R_1 + 50 \Omega = Z_0$ from Table 68.310-1

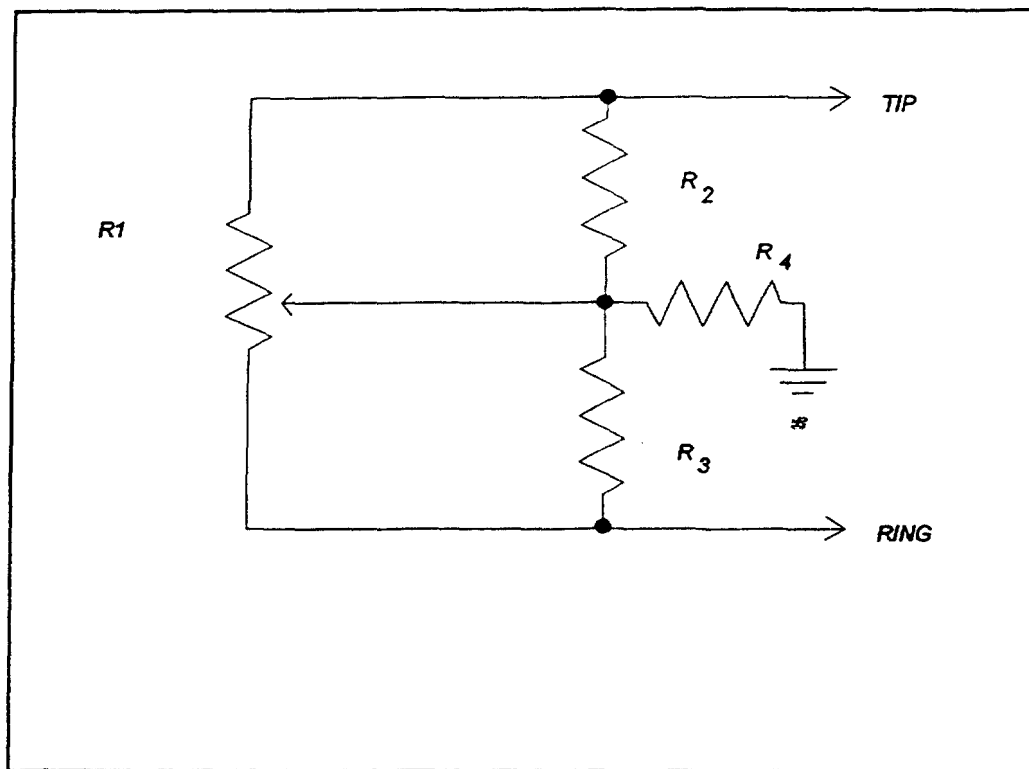
Figure 68.310-1(b)
Illustrative Test Circuit for Transverse Balance (Digital)



Z - Selected so that the reflected impedance at tip and ring is 600 Ω , 135 Ω , or 100 Ω depending on the service type of EUT

Figure 68.310-2

Required Termination for Connections to Non-Registered Equipment



Where: $R_2 = R_3 = 300 \, \Omega$, $R_4 = 350 \, \Omega$, $R_1 = 300 \, \text{k}\Omega$, for analog voiceband

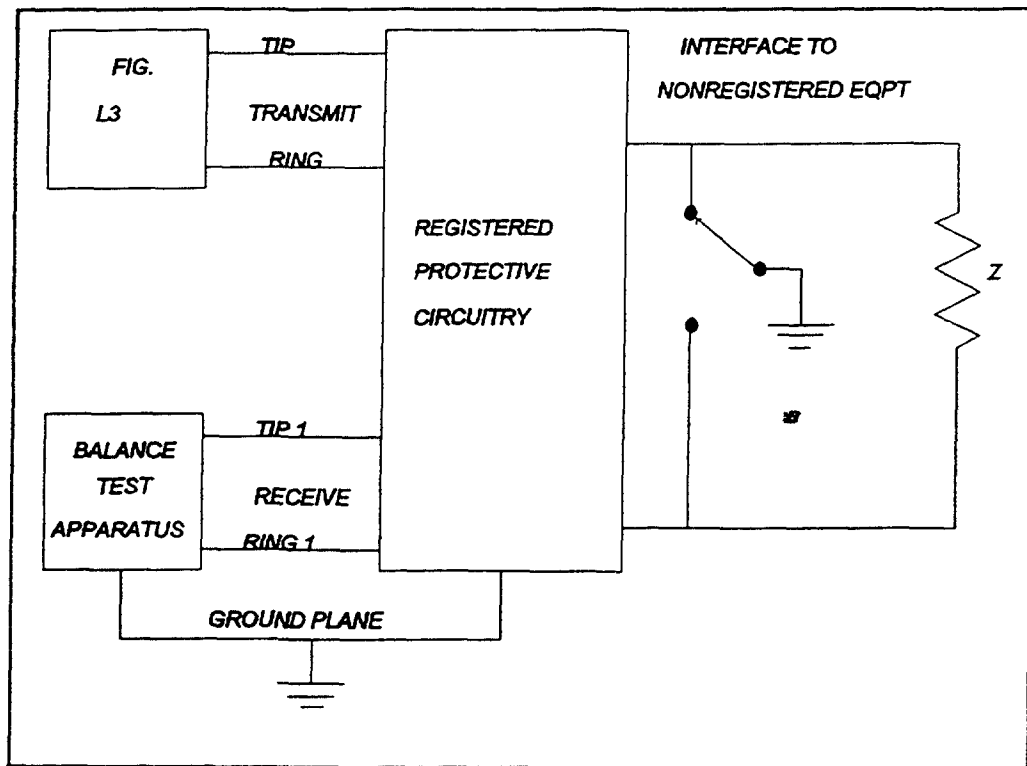
$R_2 = R_3 = 67.5 \, \Omega$, $R_4 = 56.3 \, \Omega$, $R_1 = 100 \, \text{k}\Omega$, for subrate digital

$R_2 = R_3 = 50 \, \Omega$, $R_4 = 65 \, \Omega$, $R_1 = 100 \, \text{k}\Omega$, for 1.544 Mbps

R_1 is used to adjust termination balance. Balance of this termination shall be adjusted to at least 60 dB between 200 and 1000 Hz, and at least 40 dB between 1000 and 4000 Hz, and to at least 35 dB at 1.544 MHz.

Figure 68.310-3

**Off-Hook Termination of Multiport Equipment
for Ports Not under Test**



Z Selected so that the reflected impedance at tip 1 and ring 1 is 600 Ω , 135 Ω , or 100 Ω depending on service type of EUT.

Configuration shown is for measurement of receive pair

Figure 68.310-4

Required Termination for Connections to Non-Registered Equipment

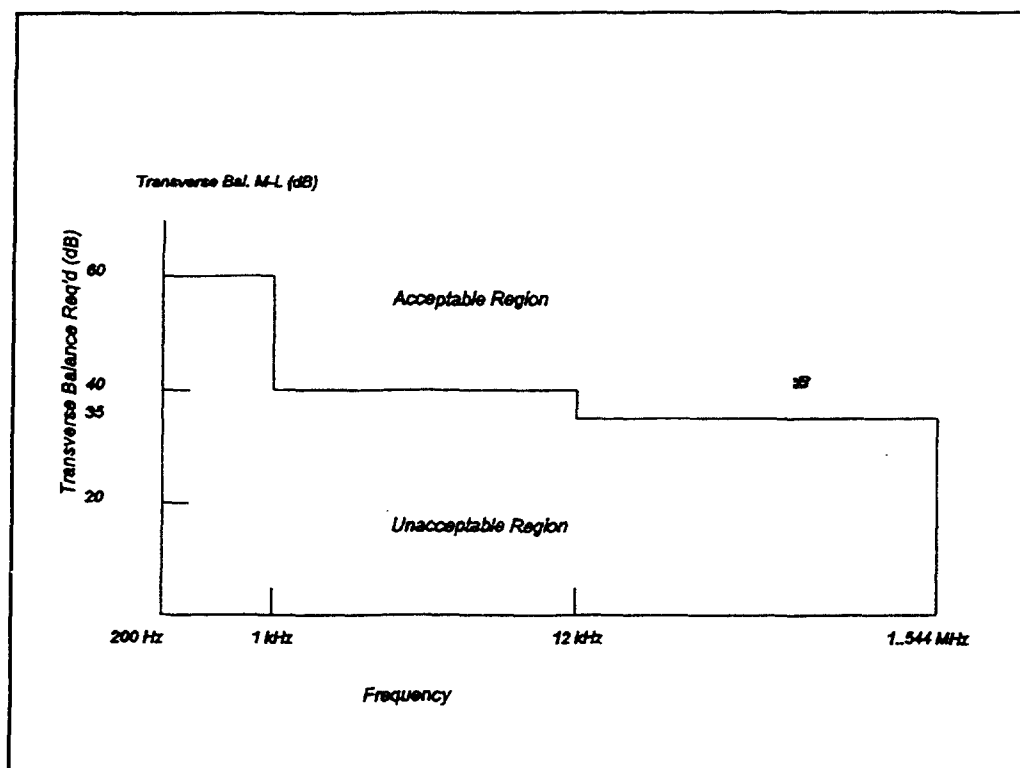


Figure 68.310-5
Transverse Balance Requirements for Digital Services

Rationale for Harmonized Requirement:

This section has been reworded to increase the utility and readability of the rules.

The transverse balance is defined in the first sentence in § 68.310(a). This term replaces the metallic to longitudinal balance terminology and is consistent with the IEEE definition for transverse Balance[†](IEEE 455).

The 60 dB balance limit from 200 to 1000 Hz for analog equipment in its on-hook mode is to avoid interference with maintenance tests for facilities used for loop start and similar applications. It is inappropriate to apply the 60 dB limit to analog equipment in the off-hook state since maintenance tests are not performed in this state. Therefore the 60 dB off-hook limit currently in the rules for analog equipment has been changed to 40 dB.

For digital equipment, two technical changes were made. First, the 40 dB limit from 12 kHz to 15 kHz has been reduced to 35 dB. This makes the 12 kHz breakpoint consistent with the longitudinal impedance specification change from 500 Ohms to 90 Ohms in Section 68.308 and in this section. The reduction in this requirement will not increase the probability of harm. The second change is in the 1.544 Mbps requirements where the lower frequency limit has been changed from 200 Hz to 10 kHz. This change was made because (1) there is little energy in the 1.544 Mbps signal below 10 kHz which can cause crosstalk interference and (2) measurements below 10 kHz require a lot more care and changes in circuitry. Thus it was concluded that there is little benefit from addressing the balance below 10 kHz for 1.544 Mbps equipment under test.

Certain additional subrate services have been added to the rules (namely, 3.2 kbps, 6.8 kbps, 12.8 kbps, 19.2 kbps, 25.6 kbps and 72 kbps.) The additional subrate services are secondary channel services except for 19.2 kbps and 72 kbps which are new subrate services. The additions complete the requirements for all the current subrate services.

§ 68.312 On-hook impedance limitations.

(Reworded and Changed)

(a) *General.* Requirements in this section apply to the tip and ring conductors of 2-wire interfaces. These requirements also apply to 4-wire loop-start or ground-start interfaces, in the following configuration:

- (1) The tip and ring conductors are connected together and treated as one of the conductors of a tip and ring pair.
- (2) The tip 1 and ring 1 conductors are connected together and treated as the other conductor of a tip and ring pair.

Throughout this section, references will be made to simulated ringing. Ringing voltages to be used and impedance limitations associated with simulated ringing are shown in Table 68.312-1.

Table 68.312-1

Ring type	Range of compatible ringing frequencies (Hz)	Simulated ringing voltage superimposed on 56.5 volts dc	Impedance limitations (Ohms)
A.....	20 ± 3.....	40 to 130 volts rms	1400
	30 ± 3.....	40 to 130 volts rms	1000
B.....	15.3 to 34	40 to 130 volts rms	1600
	> 34 to 49	62 to 130 volts rms	1600
	> 49 to 68	62 to 150 volts rms	1600

(b) *Limitations on individual equipment intended for operation on loop-start telephone facilities.*

(1) Registered terminal equipment and registered protective circuitry shall conform to the following limitations:

(i) *On-hook resistance, metallic and longitudinal (up to 100 Vdc).* The on-hook dc resistance between the tip and ring conductors of a loop start interface, and between each of the tip and ring conductors and earth ground, shall be greater than 5 megOhms for all dc voltages up to and including 100 volts.

(ii) *On-hook resistance, metallic and longitudinal (100 V to 200 Vdc).* The on-hook dc resistance between tip and ring conductors of a loop start interface, and between each of the tip and ring conductors and earth ground shall be greater than 30 kOhms for all dc voltages between 100 and 200 volts.

(iii) *DC current during ringing.* During the application of simulated ringing, as listed in Table 68.312-1, to a loop start interface, the total dc current shall not exceed 3.0 milliamperes. The equipment must comply for each ringing type which is listed as part of the ringer equivalence.

(iv) *Ringing frequency impedance (metallic).* During the application of simulated ringing, as listed in Table 68.312-1, to a loop start interface, the impedance between the tip and ring conductors (defined as the quotient of applied ac voltage divided by resulting true rms current) shall be greater than or equal to the value specified in Table 68.312-1. The equipment must comply for each ringing type which is listed as part of the ringer equivalence.

(v) *Ringing Frequency Impedance (longitudinal).* During the application of simulated ringing, as listed in Table 68.312-1, to a loop start interface, the impedance between each of the tip and ring conductors and ground shall be greater than 100 kOhms. The equipment must comply with each ringing type listed in the ringer equivalence.

(c) *Limitations on individual equipment intended for operation on ground start telephone facilities.* Registered terminal equipment and registered protective circuitry shall conform to the following limitations:

(1) *DC current during ringing.* During the application of simulated ringing, as listed in Table 68.312-1, to a ground start interface, the total dc current flowing between tip and ring conductors shall not exceed 3.0 milliamperes. The equipment must comply for each ringing type listed as part of the ringer equivalence.

(2) *Ringing frequency impedance (metallic).* During the application of simulated ringing, as listed in Table 68.312-1, to a ground start interface, the total impedance of the parallel combination of the ac impedance across tip and ring conductors and the ac impedance from the ring conductor to ground

(with ground on the tip conductor) shall be greater than the value specified in Table 68.312-1. The equipment must comply for each ringing type listed as part of the ringer equivalence.

(d) *Ringer Equivalence Definition.* The ringer equivalence number is defined to be the value determined in § 68.312(d)(1) or (d)(2), as appropriate, followed by the ringer type letter indicator representing the frequency range for which the number is valid. If Ringer Equivalence is to be stated for more than one Ringing Type, testing shall be performed at each frequency range to which Ringer Equivalence is to be determined in accordance with the above, and the largest resulting Ringer Equivalence Number so determined will be associated with each Ringing Type letter designation for which it is valid.

(1) For individual equipment intended for operation on loop-start telephone facilities, the ringer equivalence is five times the impedance limitation listed in Table 68.312-1, divided by the minimum measured ac impedance, as defined in paragraph (b)(1)(iv) of this section, during the application of simulated ringing as listed in Table 68.312-1.

(2) For individual equipment intended for operation on ground-start telephone facilities, the ringer equivalence is five times the impedance limitation listed in Table 68.312 - 1, divided by the minimum measured ac impedance, defined in paragraph (c)(2) of this section, during the application of simulated ringing as listed in Table 68.312 - 1.

(e) *Ringer Equivalence Number labeling.* Registered terminal equipment and registered protective circuitry shall have at least one Ringer Equivalence Number shown on the registration label. Where options that will vary the Ringer Equivalence are involved, either each option that results in a Ringer Equivalence Number greater than 0.1 and its corresponding Ringer Equivalence shall be listed on the registration label, or the largest Ringer Equivalence Number that can result from such options shall be stated on the label. A trained, authorized agent of the Grantee may disconnect ringers, bridge ringers to another line, or execute options affecting Ringer Equivalence after the telephone company has been notified in accordance with § 68.106.

(f) *Maximum Ringer Equivalence.* All registered terminal equipment and registered protective circuitry which can affect the ringing frequency impedance shall be assigned a Ringer Equivalence. The sum of all such Ringer Equivalences on a given telephone line or loop shall not exceed 5. In some cases, a system which has a total Ringer Equivalence of 5 or less may not be usable on a given telephone line or loop.

(g) *OPS interfaces for PBX with DID (Ring trip requirement).* PBX ringing supplies whose output appears on the off-premises interface leads shall not trip when connected to the following tip-to-ring impedance which terminates the off-premises station loop: A terminating impedance composed of the parallel combination of a 15 kOhms resistor and an RC series circuit (resistor and capacitor) whose ac impedance is as specified in Table 68.312-2.

Table 68.312-2

Ringing freq Hz	ac impedance Ohms	
	Class B or C	Class A
20 ± 3	7000/N	1400
30 ± 3	5000/N	1000

N - Number of ringer equivalences, as specified by the manufacturer, which can be connected to the off-premises station loop.

Rationale for Harmonized Requirement:

Section 68.312 has been reworded and reorganized for clarity. The committee believes the proposed revisions will eliminate the confusion associated with this section.

Table 68.312-1 This table has been revised to eliminate ringer types C through Q as they do not apply to terminal equipment within the scope of Part 68. It is the working group's understanding that terminal equipment which has these ringer types is used on party lines which are outside the scope of Part 68. Ringer type "B" has three test voltages as a function of frequency to alien the requirement criteria with the current ringer requirements. The working group believes that to limit ringer type B to a single frequency and voltage range would be more restrictive than necessary.

The requirement for a 40 kOhm maximum ac impedance was originally included in the rules because the telephone companies routinely performed ringer continuity tests to verify the continuity of the subscriber's loop. With the advent of the modularity program, it became possible for the customer to intentionally disconnect the terminal equipment. In fact,

easy disconnection became a requirement for registration. Under these conditions, the 40 kOhm requirement is not a reliable indicator of the loop conditions and the ringer continuity tests are of little value any longer.

The statements relating to the 40 kOhm requirement in (b)(1)(iv) and (c)(2) are removed because if the 40 kOhm requirement is removed, the opening of protective elements which cause a permanent on-hook condition is not a compliance failure.

The ringing equivalence definition has been redefined to be based only on the ac impedance during ringing. Forming unitless quotients for the dc parameters only confuses the rules and adds nothing to testing for harm or to administration of the program. However, although the dc equivalent has been removed from the ringer equivalence definition, there remains a dc requirements in § 68.312(b)(i), (ii), & (iii) to prevent harm to the network. Sections (h) and (i) have been renumbered.

Existing sections (i) and (j) have been deleted entirely. The working group has determined that the section (i) which addresses message registration should be removed as no terminal equipment has been registered for this service. Section (j) addresses on hook impedance limitations on voiceband private line services. The working group has determined that these requirements are no longer necessary and should be removed.

§ 68.314 Billing protection.

(Reworded and Changed)

(1) *Registered Protective Circuitry.* Registered protective circuitry connected to associated data equipment shall assure that the following signal power limitations are met for at least the first two seconds after the off-hook condition is presented to the telephone network in response to an incoming call.

(2) *Registered Terminal Equipment.* Registered terminal equipment for data applications shall assure that, when an incoming telephone call is answered, the answering terminal equipment prevents both transmission and reception of data for at least the first two seconds after the answering terminal equipment transfers to the off-hook condition. For the purpose of this requirement, a fixed sequence of signals that is transmitted (and originated within) and/or received by the registered terminal equipment each time it answers an incoming call shall not be considered data, provided that such signals are for one or more of the following purposes:

Rationale for Harmonized Requirement:

The phrase "the first" has been added to clarify the intent of the rule that no signals other than those allowed in the rules can be transmitted during the first two seconds of the connection that might interfere with the operation of the billing equipment.

§ 68.314 Billing protection.

(Reworded and Changed)

§ 68.314(b)

(1) The power delivered into a 2-wire loop simulator circuit or into the transmit and receive pairs of a 4-wire loop simulator or into a 600-Ohm termination (where appropriate) in the on-hook state, by loop-start or ground-start equipment shall not exceed - 55 dBm within the voiceband. Registered protective circuitry shall also assure that for any input level up to 10 dB above the ~~maximum level that is expected under normal~~ operation overload point, the power to a 2-wire loop simulator circuit or the transmit and receive pairs of a 4-wire loop simulator circuit or into a 600 Ohm termination (where appropriate) does not exceed the above limits.

(c) *Voice and data equipment loop current requirements for equipment connected to the Public Switched network.* The loop current through registered terminal equipment or registered protective circuitry, when connected to a 2-wire or 4-wire loop simulator circuit with the 600 Ohm resistor and 500 microfarad capacitor of the 2-wire loop simulator circuit or both pairs of the 4-wire loop simulator circuit disconnected shall, for at least 5 seconds after the equipment goes to the off-hook state which would occur when answering an incoming call.

(1) Be at least as great as the current obtained in the same loop simulator circuit with minimum battery voltage and a maximum loop resistance when a 200 Ohm resistance connected across the tip and ring of the 2-wire loop simulator circuit or connected across the tip/ring and tip 1/ring 1 conductors (tip and ring connected together and tip 1 and ring 1 connected together) of the 4-wire loop simulator circuit in place of the registered terminal equipment or registered protective circuitry; or

(2) Not decreased by more than 25 percent from its maximum value attained during this 5-second interval; unless the equipment is returned to the on-hook state during the above 5 second interval.

The above requirements also apply in the hold state.

Rationale for Harmonized Requirement

Section (1) was modified to clarify the 200 Ohm requirement applies only for the conditions of minimum battery voltage and maximum loop resistance. (This is equivalent to a minimum current of 21.9 mA.) This current is sufficient to maintain an off-hook condition and allow proper operation of the billing equipment. The additions to (c) are made to clarify the intent of the rule.

§ 68.314 Billing protection.

(Reworded and Changed)

(d) *Signaling interference requirements.*

(1) The signal power delivered to the network interface by the terminal equipment and from signal sources internal to network protection devices in the 2450 Hz to 2750 Hz band shall be less than or equal to the power present simultaneously in the 800 Hz to 2450 Hz band for the first two seconds after going to the off-hook state.

(2) Registered terminal equipment for connection to subrate or 1.544 Mbps digital services shall not deliver digital signals to the telephone network with encoded analog content energy in the 2450 to 2750 Hertz band unless at least an equal amount of encoded analog energy is present in the 800 to 2450 Hertz band for the first two seconds after going to the off hook state.

Rationale for Harmonized Requirement

When the call is initiated, the called end sends a 2600 Hz signal back to the calling end. When the called party goes off-hook, this 2600 Hz is interrupted and the billing equipment starts its cycle. For the first two seconds after the called party answers, the billing equipment is vulnerable to harm if extraneous 2600 Hz signals are present. After the first two seconds, the billing equipment has started and any signals in the 2600 Hz band for more than a nominal 30 milliseconds the call will be disconnected and the billing equipment stops.

§ 68.314 Billing protection.

(Delete)

(e) *Operating requirements for automatic identified outward dialing.*

Deleted

18

§ 68.314 Billing protection.

(New)

§ 68.314(f)

(3) *Reverse battery interface.* The power derived by a zero level decoder, in the on-hook state, by reverse battery equipment, shall not exceed -55 dBm, unless the equipment is arranged to inhibit incoming signals.

Rationale for Harmonized Requirement

This requirement was added to clarify that this rule applies to reverse battery services also.

§ 68.314 Billing protection.

(Reworded and Changed)

(g) Operating Requirements for Direct Inward Dialing.

(1) For registered terminal equipment, the off-hook state shall be applied within 0.5 seconds of the time that:

(i) The terminal equipment permits the acceptance of further digits that may be used to route the incoming call to another destination.

(ii) The terminal equipment transmits signals towards the calling party, except for the call progress tones, i.e., busy, reorder and audible ring, and the call is:

(A) Answered by the called, or another station;

(B) Answered by the attendant;

(C) Routed to a customer controlled or defined recorded announcement, except for "number invalid," "not in service" or "not assigned;"

(D) Routed to a dial prompt; or

(E) Routed back to the public switched telephone network or other destination and the call is answered. If the status of the answered call cannot be reliably determined by the terminal equipment through means such as, detection of answer supervision or voice energy, removal of audible ring, etc., the off-hook state shall be applied after an interval of not more than 20 seconds from the time of such routing.

The off-hook state shall be maintained for the duration of the call.

(2) For registered protective circuitry:

(i) Registered protective circuitry shall block transmission incoming from the network until an off-hook signal is received from the terminal equipment.

(ii) Registered protective circuitry shall provide an off-hook signal within 0.5 s following the receipt of an off-hook signal from the terminal

equipment and shall maintain this off-hook signal for the duration of the call.

Rationale for Harmonized Requirement

The working group is proposing to modify the wording for clarification. There is no change in the intent of this section. The negative portions of the section have been deleted.